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Approach to the Patient With Headache

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ABSTRACT

OBJECTIVE: The evaluation of patients with headache relies heavily on the history. This article reviews key questions for diagnosing primary and secondary headache disorders with a rationale for each and phrasing to optimize the information obtained and the patient's experience.

LATEST DEVELOPMENTS: The availability of online resources for clinicians and patients continues to increase, including sites that use artificial intelligence to generate a diagnosis and report based on patient responses online. Patient-friendly headache apps include calendars that help track treatment response, identify triggers, and provide educational information.

ESSENTIAL POINTS: A structured approach to taking the history, incorporating online resources and other technologies when needed, facilitates making an accurate diagnosis and often eliminates the need for unnecessary testing. A detailed yet empathetic approach incorporating interpersonal skills enhances relationship building and trust, both of which are integral to successful treatment.

INTRODUCTION

Headache medicine relies heavily on the patient's history, perhaps more than any other field in neurology. While laboratory tests and imaging studies assist in diagnosing a secondary headache disorder, all headache disorders are diagnosed largely by history. Unlike other neurologic diseases, the diagnosis of some headache conditions requires no further testing beyond the history and confirming that the neurologic examination demonstrates no concerning abnormalities.

The overwhelming majority of patients with headaches seen in the outpatient setting have a primary headache disorder, most often migraine. However, certain aspects of the history and examination raise the possibility of a secondary cause. Thus, a systematic approach is critical in evaluating patients with headache, with vigilance for worrisome etiologies.[1]

Headache specialists typically spend at least 30 to 40 minutes taking a history during the initial outpatient visit. The concept of doing this is daunting, particularly in a busy office with time constraints. Moreover, the amount of information one needs to obtain for certain complex headache disorders can seem overwhelming. Taking a headache history is as much an art as a skill; the

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ability to relate to the patient and get the necessary information from a conversation improves with practice and experience.[2]

This article focuses on a logical and systematic approach to taking a headache history in adults in the ambulatory setting, key questions to ask when suspecting particular diagnoses, and tools and techniques to incorporate before the visit to make the encounter more efficient and productive. For information on pediatric headache treatment, refer to the article "Headache in Children and Adolescents" by Serena L. Orr, MD, MSc, FRCPC,[3] in this issue of *Continuum*.

Having some background knowledge of the diagnostic criteria for common headaches (eg, tension-type, migraine, cluster headache) helps direct the interview (**CASE 1-1**). The International Classification of Headache Disorders, Third Edition (ICHD-3) details the diagnostic criteria for primary and secondary disorders, with a formulaic structure for both types.[4] While the clinical evaluation of the patient with headache sometimes requires "rule-out" testing to exclude a secondary disorder, the diagnosis of primary headache disorders is based primarily on the history:

- Number of lifetime episodes needed to diagnose the headache disorder
- Minimum required characteristics of the headache
- Minimum requirements for associated symptoms (eg, photophobia, nausea, trigeminal autonomic features)
- Not attributable to another ICHD-3 disorder

Note that diagnosing the disorder is not the same as diagnosing the headache phenotype. A single attack of migraine without aura ("You had a migraine.") does not satisfy the criteria for having the disorder, which requires at least five lifetime attacks ("You have migraine.").

Secondary headaches have a common diagnostic structure as well:

- The patient has a headache (which may be further elaborated)
- A secondary cause was diagnosed (eg, intracranial pressure disorder, subarachnoid hemorrhage, tumor, infection, inflammatory condition)
- There is a temporal relationship between the onset of the headache and the secondary diagnosis
- The headache improves or resolves when the underlying cause is treated

Keep in mind that the ICHD-3 is designed to diagnose the headache, not the underlying condition. Many of the secondary headache criteria do not specify particulars regarding the examination or diagnostic testing needed to make the causative diagnosis.

There is no need to memorize the ICHD-3 (available online at ichd-3.org), but it is important to become familiar with the most common primary headache disorders (eg, tension-type headache, migraine with and without aura, cluster headache) and be aware of red flags for suspecting a secondary cause.

CONDUCTING THE INTERVIEW

The best results occur when the patient's headaches are the sole topic covered during the visit. If a patient happens to mention that they have headaches as they

KEY POINT

- **Primary headache disorders are the most frequent types encountered in the outpatient setting. Basic knowledge of the International Classification of Headache Disorders, Third Edition (ICHD-3) criteria for the most common headache types helps to direct the line of questioning during the interview.**

CASE 1-1

A 51-year-old woman was seen in the clinic with a primary concern of "eye migraines." Her headaches had started in her mid-twenties and had not changed over time. They were exclusively located in and around her right eye. She described pressure, "like someone is pushing my eye out," that peaked to excruciating pain within 20 minutes of onset. There was associated photophobia (more so in the right eye), nausea, vomiting, ipsilateral conjunctival injection, and rhinorrhea. Lying down did not help and she generally sat in a chair with her fist pressed into her eye socket. Sumatriptan 100 mg orally had little effect. The headaches occurred two to three times weekly and lasted 5 hours in total with no interictal pain. They sometimes awakened her from sleep between 2:00 AM and 5:30 AM but there was no consistent circadian pattern. Alcohol triggered them so she stopped drinking.

She had well-controlled hypercholesterolemia and no other medical problems. She never smoked cigarettes. Her son had similar headaches with no other family history of headache. Her medications consisted of a multivitamin, a vitamin D supplement, atorvastatin daily, and sumatriptan 100 mg orally as needed. Previous acute treatments consisted of butalbital compound, eletriptan, ibuprofen, naproxen, and a combined formulation of acetaminophen, aspirin, and caffeine, all of which were ineffective. Previous preventive medications consisted of topiramate 200 mg daily (which produced cognitive dysfunction), nortriptyline 10 mg (which was too sedating to increase further), sodium valproate (which was ineffective and stopped due to weight gain), and onabotulinumtoxinA, all of which were ineffective. Further questioning revealed that the most severe pain lasted for 2.5 hours with lingering pain for another 1.5 hours.

Verapamil 80 mg twice daily was initiated for prevention and gradually increased to 160 mg twice daily with improvement, but it produced intolerable constipation. Galcanezumab 300 mg subcutaneous self-injection monthly was started with a marked reduction in her headache frequency and severity, so verapamil was tapered and discontinued. Zolmitriptan nasal spray 5 mg at the onset of headaches aborted them.

COMMENT

This case exemplifies how obtaining detailed information about the headache pain pattern (intensity and duration) can lead to an accurate diagnosis in a patient whose headaches were previously misdiagnosed as migraine and thus ineffectively treated. The patient's headaches had features of both migraine and cluster headache, and she met the International Classification of Headache Disorders, Third Edition, diagnostic criteria for cluster headache. Patients with cluster headache may also have "migraine" features, such as nausea, vomiting, and photophobia.

are walking out the door from a visit that addressed a different problem, schedule a separate visit to discuss their headaches. That way, the patient can prepare and organize their information, you will have enough time to address the problem, and it conveys the message that their headaches are taken seriously.

Communication and Interpersonal Skills

Effective interviewing incorporates communication and interpersonal skills.[5] Communication skills can be operationalized, and hence computerized questionnaires and artificial intelligence applications can obtain a history, make a diagnosis, and recommend therapy with good reliability.[6] Structured interviews can help diagnose common chronic headache types and exclude secondary causes.[7] Interpersonal skills or "humanistic qualities," on the other hand, are more difficult to operationalize as they involve relationships. Constructs important to effective interpersonal skills include demonstrating respect for the patient, being fully present and paying attention through verbal and nonverbal signs of interest, and showing empathy and genuine caring.[8]

Active listening is a technique that focuses on the patient. It involves listening to and understanding the patient's spoken content, interpreting nonverbal messages (eg, posture, facial expressions, tone, observable responses), incorporating socioeconomic factors (eg, cultural beliefs, access to support from others), and listening with empathy.[9]

Repeating what the patient conveyed helps to reflect empathy (eg, "Your migraines really affect your life. They cause you to miss work, your job is in jeopardy, and you cannot make plans.").

Taking the History

The American Migraine Communication Study showed that open-ended questions tend to yield the most information during the interview, particularly regarding impairment.[10] However, the patient's approach to the narrative may be structured completely differently than the interviewer's thought processes. The interviewer needs to know about specific aspects of the headaches to make a diagnosis, while the patient often wants to convey the impact of the headaches on their life and (surprisingly) may not have paid much attention to the details of what they experience during a headache attack.

WHAT IS THE PRIMARY CONCERN THAT BRINGS YOU HERE? The primary concern is not the referring diagnosis, but rather the patient's own words. "Dr XYZ referred me here" is not a primary concern.

As in a novel or play, the opening line is important. Ranging from analytical to profound, mundane, or emotional, you know where the patient is coming from in ten words or fewer. Some patients seek a diagnosis, while others are looking for an etiology, a prognosis, a more effective treatment, or just someone who listens and takes them seriously.

TELL ME ABOUT YOUR HEADACHES. Some patients are not sure where to start when describing their headache history. As we are interested in the course of headaches over time, ask them to start at the beginning. (This author also follows the request with, "I will probably interrupt you at some point. Please don't be offended; I am not trying to be rude".) Many adults seeking care started having headaches in childhood. They may not remember the details but most can recall

KEY POINTS

- Good communication and interpersonal skills, along with active listening and awareness of nonverbal cues, contribute to an empathetic and caring conversation with patients undergoing evaluation for headache.
- While closed-ended questions are necessary to make a headache diagnosis, the American Migraine Communication Study found that open-ended questions were often more time efficient and provided critical information regarding impairment.
- When evaluating patients with headache, establishing the primary concern sets the stage and immediately informs the interviewer of the patient's goals.

the approximate frequency of headaches; whether they had any warning symptoms, needed to lie down in a dark, quiet room, experienced nausea and vomiting, missed school or events, or left school early or went to the nurse's office; the headaches' duration; and how they treated their headaches. You may be able to determine the location and quality of the pain (eg, aching, throbbing, stabbing). Females can usually recall whether there was a relationship to menarche, menses, or pregnancy. If the information is not spontaneously forthcoming, just ask what you need to know.

The next step is finding out what happened over time. Did the headaches change in character, duration, intensity, or frequency? Commonly, the patient replies that "they got worse." One way to discern whether the worsening was an intensification of the initial headache is to ask, "Was it the same headache but with the volume turned up, or a completely different headache?" At that juncture, more pointed questions can determine exactly what changed.

Some people have more than one type of headache and each needs to be described separately. They may name them (correctly diagnosed or not, eg, migraine, stress headache, eye headache, dagger headache), and using the patient's own terminology or numbering them (eg, headache number one, headache number two,) helps focus the interview (CASE 1-1). Ask the patient to prioritize their most severe, disabling, concerning, or bothersome headache type in those situations. When eliciting the history of a headache attack, I find it helpful to ask the patient to "talk me through a typical headache from start to finish; describe everything that you experience during an attack." It may take more than one visit to work through all of them.

This is the opportunity to get the details regarding the timing of various aspects of the headache phenotype. Certain features of the headache help make the diagnosis, including age at onset, warning signals (prodrome or aura), location of the pain, character of the pain, tempo of pain progression and time to peak intensity, circadian pattern (eg, awakening the patient from sleep at a particular time, present upon awakening, occurring at specific times during the day), associated symptoms, aggravating or relieving factors, how they feel after the pain resolves, and how the headache affects their ability to function. Besides knowing about the bad times, ask about the good times: "How often are you completely headache free?" It may be surprising to learn that a patient always has some type of headache but can continue functioning with it or perhaps even ignore the milder ones.

DO YOU GET ANY WARNING THAT YOU ARE GETTING A HEADACHE BEFORE THE PAIN STARTS? This question addresses prodrome and aura. Prodrome may occur up to 48 hours before the onset of migraine pain. Patients may not even realize that they experience prodrome symptoms or that they are related to migraine; prodromal symptoms are often misinterpreted as triggers.[11] Ask specific questions, querying about uncontrollable yawning, change in mood, tiredness, cognitive dysfunction, food cravings, excessive thirst or urination, or neck pain.[12,13] When the associated symptoms of migraine (ie, nausea, photophobia, and osmophobia) begin before the onset of aura or headache, they are considered prodromal.

Aura is a transient symptom arising from the brain that typically precedes the headache but may occur during the headache phase, after the headache, or as an isolated event.[14] Aura transpires in approximately 30% of patients with migraine

and occasionally occurs with cluster headache. Typical aura is visual, somatosensory, or affects speech and language, lasting 5 to 60 minutes. Manifestations of aura include flashing lights, shimmering zigzag lines with or without an enclosed area of scotoma, sparkles, dots, homonymous hemianopia, tunnel vision, visual distortion (metamorphopsia), transient visual loss, other vision problems, aphasia (typically expressive), numbness, paresthesia, phantosmia, auditory hallucinations, weakness, imbalance, vertigo, diplopia, altered levels of consciousness, Alice in Wonderland syndrome (ie, an alteration of visual perception characterized by distorted body images, external environment, or both), and other neurologic symptoms.[15] Multiple aura symptoms generally occur in succession rather than a simultaneous onset, distinguishing them from transient ischemic attack or stroke. For more on aura, refer to the article "Migraine Pathophysiology" by Nazia Karsan, PhD, MRCP,[16] in this issue of *Continuum*.

LET'S TALK ABOUT HOW YOUR HEAD PAIN STARTS. WHERE IS IT LOCATED AT FIRST? DOES IT SPREAD OR TRAVEL? Migraine often starts in the neck and spreads anteriorly. Alternatively, it may start on one side of the head, around the eye or sinus area. Sometimes it begins on one side and later moves to the contralateral side of the head or becomes bilateral. While the diagnostic criteria for migraine include unilaterality, about 40% of adults and most children have bilateral head pain. Unlike other types of headaches, the location may vary from attack to attack in an individual.[17]

The trigeminal autonomic cephalalgias are almost always centered around one eye. Cluster headache pain may be orbital or retro-orbital, involving the ipsilateral temple, forehead, jaw, or face. Patients will often point to the specific area of pain. Tension-type headache is nearly always bilateral, sometimes bandlike, but need not involve the entire head. Patients with nummular headache outline a well-circumscribed round or oval area on the head to localize the pain.

If the headache is unilateral, ask the patient, "Are your headaches always on the same side of your head?" The head pain in individuals with unilateral migraine pain commonly occurs on either side of the head unpredictably, but some people have attacks that always occur on the same side of the head. During a bout of cluster headache and with the other trigeminal autonomic cephalalgias, the pain is side-locked, always occurring on the same side. Hemicrania continua is side-locked by definition, although the pain may not encompass the entire side of the head (**CASE 1-2**). A de novo side-locked headache may signal a secondary headache disorder such as a structural intracranial process, giant cell arteritis, or a CSF pressure disorder.

HOW WOULD YOU DESCRIBE THE PAIN? WHAT DOES IT FEEL LIKE? Prompting is sometimes required for this question, such as throbbing, pounding, sharp, stabbing, shooting, aching, pressurelike, or burning. Sometimes this question backfires and the patient responds with adjectives describing the pain intensity or a number on the pain scale, in which case you can either redirect them or transition to the question about intensity.

Throbbing, pounding pain is characteristic of migraine. However, migraine pain may be steady, aching, or stabbing.[18] Tension-type headache is pressurelike, aching, or squeezing, like wearing a hat or headband that is too tight.[19] Cluster headache is described as stabbing, boring, hot poker, knifelike, or drilling, "like someone stuck an ice pick in my eye."

KEY POINTS

- One of the most helpful questions to ask during a headache evaluation is, "How often do you feel completely clear and headache free?"
- Prodromal symptoms of headache are often misinterpreted as triggers.
- When considering migraine, ask about specific "warning signs," such as prodrome and aura manifestations.
- Side-locked (strictly unilateral) headaches may occur in migraine and cluster headache but sometimes signal a more worrisome secondary cause.

HOW SEVERE IS THE PAIN WHEN IT STARTS AND HOW SEVERE DOES IT GET? HOW LONG DOES IT TAKE FOR THE PAIN TO REACH PEAK INTENSITY? The intensity questions are helpful for diagnosis and treatment. Migraine characteristically starts with mild pain that gradually builds in intensity. The time to peak intensity is quite variable and this aspect of pain development is extremely important when selecting an acute treatment strategy. If the pain crescendos over hours, oral acute therapies are the preferred option as there is enough time for systemic absorption if they are taken early in the episode. Patients experiencing pain that peaks in intensity within 30 minutes may require nonoral acute treatment if rapidly acting oral treatment is ineffective. For more on acute treatments, refer to the article "Acute Treatment of Migraine" by Rebecca Burch, MD, FAHS,[20] in this issue of *Continuum*.

Cluster headache and episodic and chronic paroxysmal hemicrania typically peak in intensity within several minutes.[21] Hence, there is not enough time for oral agents to take effect, and other routes of administration are employed such

CASE 1-2

A 24-year-old woman presented to the clinic for evaluation of recurrent headaches that had been previously diagnosed as chronic migraine without response to initial treatments. Her headaches were always left sided, occurring 16 days a month. There was no prodrome or aura. She described moderate to severe pain associated with photophobia, phonophobia, osmophobia, nausea, and worsening with activity. The pain was throbbing in quality and peaked in intensity within 2 hours of onset. Zolmitriptan reduced the pain intensity and the headaches resolved in 8 to 10 hours with residual fatigue the next day. Thus, each attack impaired her for 2 days and she often missed work because of them. Previous preventive treatments were all ineffective, including amitriptyline 75 mg daily, nortriptyline 50 mg daily, topiramate 150 mg daily, propranolol 160 mg daily, and onabotulinumtoxinA. Her neurologic examination and brain MRI were normal. Erenumab 140 mg monthly subcutaneous self-injection was prescribed.

The patient returned for follow-up 6 weeks later and reported no change in her headache. Having done some online research, she asked, "Could I have hemicrania continua?" A review of her initial visit note showed no mention of interictal pain. However, further questioning revealed that she had constant left temporal pain which was typically mild and she was able to function with it. All of her pain resolved after beginning treatment with indomethacin 50 mg 3 times daily. After a few months, the dose was tapered but her headaches returned at a dose of 25 mg 3 times daily. She remained on indomethacin 100 mg thereafter with no headache recurrence or adverse effects.

COMMENT

This case stresses the importance of asking about completely headache-free days, particularly in an individual with side-locked headaches. Although previously diagnosed with chronic migraine, the patient had hemicrania continua which responded to indomethacin.

as inhalation (oxygen for cluster headache), subcutaneous injection, and intranasal delivery.

The pain intensity of migraine varies but is generally moderate to severe, compared with mild to moderate pain in tension-type headache. Severe to very severe pain characterizes cluster headache and paroxysmal hemicrania; most patients indicate that it is the worst pain they have ever experienced and some patients report suicidal ideation during an attack.[22]

Pain that starts instantly at peak intensity is called *thunderclap headache*.[23] While thunderclap headache may be a primary headache disorder, it raises concern for a secondary headache, particularly as a new-onset headache. Conditions producing thunderclap headache include reversible cerebral vasoconstriction syndrome, subarachnoid hemorrhage, meningitis, and spontaneous intracranial hypotension. Thus, primary thunderclap headache is a diagnosis of exclusion, requiring brain and cerebrovascular imaging.

DO YOUR HEADACHES OCCUR AT ANY PARTICULAR TIME OF THE DAY OR NIGHT? DO THEY AWAKEN YOU FROM SLEEP? ARE THEY PRESENT UPON AWAKENING? Headaches that awaken the patient from sleep need to be distinguished from waking up during the night for other reasons and noticing that the headache is present. Some patients have a hard time discerning the difference. If the patient has nocturnal awakening or wakes up in the morning with a headache, it is helpful to note the severity of the pain, whether it has already peaked in intensity, and if other symptoms (eg, nausea, vomiting, tearing, rhinorrhea) are present at the time.

These questions assist in both diagnosis and treatment. Recurrent episodes of nocturnal awakening can be a symptom of secondary headaches, particularly sleep disorders, acute medication overuse (when the medication wears off during sleep), chronic obstructive pulmonary disease, nocturnal hypertension, or brain tumors.[24,25] However, nocturnal awakening also occurs in primary headache disorders including migraine, cluster headache, hypnic headache, and paroxysmal hemicrania.[26,27] Circadian periodicity is a feature of cluster headache.[27,28] Migraine may also display a circadian preference as the most common time to experience migraine is upon waking up in the morning.[29]

ARE THERE OTHER SYMPTOMS OF A PRIMARY HEADACHE DISORDER? The associated symptoms of various types of headache conditions sometimes lead to greater impairment than the head pain (referred to as *most bothersome symptoms*). Photophobia is the most common associated symptom in the United States. Others include phonophobia, osmophobia, nausea, vomiting, diarrhea, aura symptoms during the headache, and the following trigeminal autonomic features[21]:

- Ptosis
- Lacrimation
- Conjunctival injection
- Nasal congestion or rhinorrhea
- Miosis
- Aural fullness
- Facial pallor, flushing, diaphoresis
- Red ear (may occur separately from a headache)[30]

KEY POINTS

- Determining the time between pain onset and peak intensity helps with both headache diagnosis and treatment.
- Nocturnal awakening from headache does not always signal a brain tumor. It occurs with acute medication overuse and in primary headaches, sleep apnea, and other medical conditions.
- Associated symptoms, including trigeminal autonomic features, are characteristic of cluster headache and other trigeminal autonomic cephalalgias but may also occur in migraine, although usually less prominently.
- Ascertaining the patient's behavior and actions during a headache helps diagnose migraine and cluster headache.

Suggested wording for asking questions about some of the associated symptoms is listed in TABLE 1-1.

Ask the patient if they have photographed their appearance during an attack. If not, request that they do so during a future episode.

Although trigeminal autonomic symptoms suggest a trigeminal autonomic cephalalgia, they may also occur in migraine. Their presence in migraine is often less pronounced (eg, slight watering of the eyes rather than tears streaming down the face) than with the trigeminal autonomic cephalalgias and are most often bilateral.[31] Headaches accompanied by nasal congestion or rhinorrhea may be incorrectly interpreted as sinus related; such headaches are usually either migraine or cluster headache.[32,33]

The associated symptoms can be inferred in children or adults who cannot communicate these details. For information on pediatric headache treatment, refer to the article "Headache in Children and Adolescents" by Serena L. Orr, MD, MSc, FRCPC,[3] in this issue of *Continuum*.

WHAT DO YOU PREFER TO DO (PHYSICALLY) DURING AN ATTACK? Even if the patient cannot lie down because of situational circumstances, do they *prefer* lying down, sitting, pacing, or moving? If recumbent, can they lie motionless, or are they unable to get comfortable due to thrashing, tossing, or turning.? If they sit, do they sit quietly or rock back and forth in the chair? Is there a change in demeanor such as agitation?

One of the most diagnostically helpful characteristics of migraine is worsening with activity, and the overwhelming majority of patients with migraine prefer to lie down motionless in a dark, quiet environment. However, circumstances often dictate or constrain a patient's physical response to a headache attack. In contrast, patients with cluster headache rarely prefer being motionless and experience restlessness or agitation.[21,27] They may pace, rock back and forth, toss, turn, or thrash in bed (eg, "Are you able to lie still, or do you thrash in bed?"), or inflict bodily injury on themselves for distraction, such as banging their head or body parts against the wall or digging their fingernails into their skin. Vocalization during a cluster attack may occur, including yelling or screaming.

IS YOUR SKIN SENSITIVE TO TOUCH DURING THE HEADACHE? Cutaneous allodynia is the experience of pain or discomfort with a stimulus that is not ordinarily painful, such as touching the skin. About 60% of patients with migraine report that their hair hurts, they cannot brush their hair or put it in a ponytail, they need to take off jewelry or clothing, they are unable to tolerate taking a shower or the weight of the sheets or blankets touching them, and they do not want anyone else to touch them during a migraine.

Cutaneous allodynia is a feature of the central sensitization of second-order (cephalic sensitization) and third-order (somatic sensitization) nociceptive trigeminal nucleus caudalis neurons.[34] During central sensitization, the threshold for noxious stimuli to produce pain decreases and the nervous system is in a heightened state of reactivity, causing a sensation of pain in response to stimuli that are normally not pain provoking. Central sensitization is also associated with the development and sustainment of chronic pain.[35]

HOW LONG DOES THE SEVERE PAIN LAST? The headache diagnosis is often defined by its duration, particularly for the trigeminal autonomic cephalalgias. Cluster

Suggested Wording for Selected Headache Interview Questions

TABLE 1-1

Phenomenon	Question	Comments
Migraine-associated symptoms[a]		
Photophobia	Does light bother your eyes?	
	Would you prefer being in a dark environment?	Some people will keep working or continue other activities despite the associated symptoms
	Are you able to use the computer or watch TV?	
	Do you keep your home dark?	Interictal photophobia
Phonophobia	Does noise bother you?	
	Do noises sound abnormally loud?	
	Do you need to turn off music or the TV?	
	Would you prefer being in a quiet environment?	
Osmophobia	Do smells or odors bother you?	Odors can also be a trigger or perceived trigger
Nausea	Are you nauseous?	A common answer is "No, I don't vomit."
	Are you queasy, sick to your stomach, or feel like you will vomit?	Many people confuse nausea for vomiting
Vomiting	Do you vomit?	
	(If so) Does vomiting help?	People may even induce vomiting if it provides relief
Worsening with routine physical activity	Does moving around, such as walking or going up stairs, affect your headaches?	This is characteristic of migraine
	Do you prefer lying down during one?	
Worsening with exertion	Does exercise, heavy lifting, or sexual activity affect your headaches?	
March of symptoms	When you experience (name the symptoms that the patient describes, typically numbness or weakness), does it start all at once or does it travel or spread?	Spread of numbness or weakness is typical of migraine
Progression of symptoms	When you experience (name the symptoms that the patient relates), do they start all at once or do they progress from one to another?	Aura symptoms progress, as opposed to transient ischemic attack or stroke
	(If they progress) Is there a typical pattern of progression?	
Visual symptoms		
Homonymous hemianopia	Do you lose vision from one eye only or is one-half of the world missing?	Homonymous visual field loss is often mistaken for monocular vision loss; monocular visual loss does not split the world in half because of the intact nasal visual field in the contralateral eye
	If you looked at a clock, what would you see?	If only half of the clock is seen, the defect is homonymous
	Have you ever covered one eye, then the other, to see if your vision looks the same or different with either eye?	With true monocular visual loss, the vision looks different from the affected eye

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Phenomenon	Question	Comments
Scintillating scotoma	Is the image still present with your eyes closed?	The classic scintillating scotoma persists when the eyes are closed
	Have you ever covered one eye, then the other, to see if your vision looks the same or different with either eye?	The classic scintillating scotoma originates from the cortex and is binocular; patients sometimes report that it is seen in one eye only, rather than the ipsilateral visual field
Blurred vision	Do you mean blurred as in "out of focus," or is part of your vision missing?	Distinguishing true blurred vision from a scotoma; blurred vision is not considered an aura symptom
Diplopia	When you see double, are the images separated horizontally or vertically?	Demonstrate with your hands
	If you cover one eye and then the other, does the double vision go away?	Migraine with brainstem aura and hemiplegic migraine can produce binocular diplopia; the diplopia is present only with both eyes open, and each eye sees only one image; other types of primary headaches cause monocular diplopia, which may be bilateral and is likely due to ocular surface dryness
Alice in Wonderland syndrome	Do things ever look too large, too small, too close, or too far away?	
	Do you ever feel like you are larger or smaller than you really are?	
Trigeminal autonomic symptoms and signs[b]		
Ptosis	Do your eyelids droop or close?	
Lacrimation	Do your eyes tear?	If yes, ascertain if one or both eyes and whether the tearing is ipsilateral to the pain
	Do the tears stream down your face or is it just a little bit of tearing?	Mild tearing may occur in migraine but profuse tearing is typical of the trigeminal autonomic cephalalgias
Rhinorrhea	Do you have a runny nose?	
	(If yes) Do you have the sniffles or fluid dripping down your face?	Mild rhinorrhea may occur in migraine, but profuse rhinorrhea is typical of the trigeminal autonomic cephalalgias
Miosis	Has anyone noticed that one pupil is smaller (or larger than the other)?	Pupils can become larger or smaller during a headache attack, affecting one or both eyes
	(If yes) Which is the smaller pupil?	Horner syndrome consists of a smaller pupil and ipsilateral ptosis
Aural fullness	Do you have a sensation of fullness or stuffiness in your ear?	
	(If yes) Which ear?	

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Phenomenon	Question	Comments
Symptoms of various secondary headache conditions		
Orthostatic headache	How do you feel when you first wake up, before you get out of bed?	When patients have orthostatic headaches that start or worsen almost immediately after arising, asking "How do you feel in the morning?" may provide a misleading answer
	How long does it take once you are upright for the headache to start?	
	Does lying down, without going to sleep, help?	Patients often confuse lying down with going to sleep; you are trying to isolate the postural component from relief with sleep
	If so, how long does it take for your headache to get better?	
	Does the headache completely go away when you lie down?	
	How long can you be upright before you need to lie down?	
Worsening with Valsalva maneuver	Does coughing, sneezing, straining (such as during a bowel movement), laughing, or singing affect your headaches?	
Transient visual obscurations	Does your vision ever completely "go out" on you?	
	(If yes) Does that happen in one or both eyes? If one, which eye?	
	Is there anything that brings it on?	Bending over and eye movements are common precipitators
	How long does the visual loss last?	When associated with increased intracranial pressure, the episodes usually last seconds to a few minutes
Jaw claudication	Do you have pain or weakness in your jaw while chewing your food?	Very sensitive screen for giant cell arteritis

[a] May be present in other headache types.
[b] Trigeminal autonomic cephalgias and migraine.

headaches last 15 to 180 minutes when untreated or unsuccessfully treated, but some patients experience milder pain in between the severe attacks; the duration of the severe pain is the defining characteristic. While the severe pain of migraine is the most disabling, patients often have lingering pain lasting up to a day afterward.

Questions such as "How do you feel after the pain is over?" and "How long does it take to feel 'back to normal'?" allude to the postdrome, which is a common feature of migraine, otherwise known as the migraine "hangover." There may be

mild residual pain, fatigue, cognitive dysfunction ("brain fog"), hunger, gastrointestinal symptoms, sensory sensitivity, or vertigo lasting up to 1 to 2 days.[36] Note that this is part of the migraine attack and should be considered when determining the number of migraine days in a given period. Effects or side effects of acute medications may cause similar symptoms, making it difficult to distinguish the etiology in some patients; however, postdrome symptoms are most frequently incorrectly attributed to medications.[36] For patients who are rarely or never headache free, it is important to ask how long it takes to return to their baseline state.

DO YOU HAVE SYMPTOMS BETWEEN ATTACKS (EG, PAIN, PHOTOPHOBIA, PHONOPHOBIA, OSMOPHOBIA)? Although we tend to concentrate on headache attacks when taking a history, symptoms can persist into the interictal phase, particularly in migraine, tension-type headache, and cluster headache.[37,38] Several lines of evidence document that patients with episodic and chronic migraine have a poorer quality of life in between episodes compared with those without migraine.[37]

Functional imaging studies corroborate changes in the brain during this interictal phase.[39] In addition to the aforementioned symptoms, the interictal burden of migraine is associated with photophobia, anxiety (fear of the next attack), depression (inability to make plans because of the possibility of having a migraine episode), motion sickness, fear of upcoming events, stigma (reluctance to tell others about their headaches), and worse interpersonal interactions with others.[37,40] Individuals experiencing interictal impact from migraine report having to alter their lifestyle to avoid triggers or in response to an impending attack.[41] Furthermore, migraine affects work, career, daily activities, relationships, and even the decision to have children. Preventive migraine treatment benefits patients experiencing interictal burden.[34,38] For more information, refer to the article "Preventive Treatment of Migraine" by Richard B. Lipton, MD, FAAN,[42] in this issue of *Continuum*.

HOW MANY DAYS IN ONE MONTH ARE YOU COMPLETELY HEADACHE FREE AND "CLEAR HEADED"? People tend to report their worst headaches but may have other, milder headaches that they "live with" and can continue functioning through. Neglecting to ask about pain freedom in addition to pain days may lead to an incorrect diagnosis. An example is hemicrania continua, where chronic, low-level pain on one side of the head is punctuated by more severe ipsilateral attacks that resemble migraine.[43] The diagnosis of hemicrania continua is predicated on a therapeutic response to indomethacin, so missing the constant unilateral headache delays the diagnosis. This point is demonstrated in **CASE 1-2**. For more on hemicrania continua, refer to the article "Indomethacin-Responsive Headache Disorders" by Peter J. Goadsby, MD, PhD, FRS,[44] in this issue of *Continuum*.

The ICHD-3 diagnosis of chronic migraine specifies having headaches on more days than not (at least 15 days per month), of which at least 8 days are migraine.[4] Capturing only the 8 migraine days puts the patient in a different diagnostic category, which affects their preventive treatment options.

HAVE YOU IDENTIFIED ANYTHING THAT TRIGGERS YOUR HEADACHES? The concept of migraine triggers is controversial, as some presumed triggers may actually be premonitory symptoms (eg, food cravings, bright lights, loud noise, neck pain).

Classifying one exposure followed by a migraine episode as a trigger is insufficient, as a pattern of cause and effect must be established. That said, many individuals with migraine relate that exposure to a trigger does not result in a migraine 100% of the time. One observational study using a smartphone app showed that, except for neck pain, even the most frequently reported triggers were present in fewer than one-third of individuals reporting them.[45] Commonly perceived triggers include odors (eg, volatile substances, fragrances, smoke), stress (during or following a migraine attack), weather (eg, heat, sferics [atmospheric electromagnetic impulses resulting from lightning]), missing meals or hypoglycemia, changes in sleep pattern, dehydration, menses, alcohol, caffeine, and various foods (eg, aged cheese and other aged foods, monosodium glutamate).[46] Headache is a side effect of many medications, including medications used to treat headache, which also needs to be considered.

When patients identify a reproducible trigger, avoiding it is helpful. However, if the suspected trigger is actually a premonitory symptom, the patient may be restricting their exposure unnecessarily. One example of this is chocolate, which may be consumed as a prodromal food craving when the headache occurs regardless of what one eats. Thus, identifying true triggers helps mitigate exposure, but incorrect trigger attribution leads to hypervigilance that affects quality of life.

HOW DOES MIGRAINE (OR YOUR HEADACHES) IMPACT YOUR LIFE, EVEN WHEN YOU ARE NOT HAVING ONE? The American Migraine Communication Study recorded office visits with 60 patients and clinicians (14 primary care physicians, 8 neurologists, and 6 advanced practice providers) and subsequently interviewed the patient and clinician separately to determine their impressions of the visit.[10] There was a marked discordance between the patients' and clinicians' perceptions. While clinicians were generally satisfied with the flow, content, and outcome of the encounter, patients indicated that the personal impact of having migraine was not addressed. This study highlighted the importance of incorporating a question about impairment or migraine-related disability into the interview. Assessing this information adds to the overall understanding of the patient experience, strengthens the relationship with the patient, and drives treatment decisions regarding headache prevention.

DO ANY OF YOUR FAMILY MEMBERS HAVE HEADACHES (OR THE PATIENT'S SPECIFIC TYPE)? Some patients have clear knowledge of their family history, while others are less certain. Inaccuracies arise almost 50% of the time when taking the family history from the patient's report.[47,48] When unable to interview the relative personally, a diagnosis may be inferred, but not confirmed, if some basic details are known. For example, if a patient relates that her mother had headaches associated with vomiting ("sick headaches") and spent 2 days lying down in her dark, quiet bedroom, she likely had migraine. An uncle who had very severe headaches associated with tearing and a runny nose may have had cluster headache. Challenges to obtaining an accurate family history arise when some family members never received a diagnosis, were incorrectly diagnosed, or did not talk about their headaches.

Migraine tends to run in families, with up to 80% of children with migraine having a positive family history of migraine.[49] However, studies of family history in migraine and cluster headache are limited by validation of the diagnosis in family members and increased awareness of the condition over time. Certain

KEY POINTS

- Determining how long it takes to return to normal after headache pain resolves provides insight into the attack's true duration and the patient's ability to function.
- Patients tend to emphasize their most severe headaches, leading to an underestimation of their headache burden.
- The subject of headache triggers is somewhat controversial. Patients may mistakenly attribute an exposure before a migraine as a trigger when it is actually part of the prodrome (eg, food cravings, neck pain).
- Some types of headaches run in families, such as migraine, cluster headache, familial hemiplegic migraine, and cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL).

types of migraine have a higher genetic load, such as migraine with aura, hemiplegic migraine, and cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL). The latter two disorders are caused by known genetic variations with autosomal dominant inheritance. As is true with most genetic diseases, early onset of migraine is associated with migraine in first-degree relatives.[50] A population study of 73 probands and 72 matched controls including interviews with 511 first-degree relatives showed a 50% higher risk of migraine in probands versus controls.[51] The risk was higher for relatives of probands with disabling migraine. The authors concluded that familial factors (genetic or family environment) accounted for less than one-half of migraine cases. A family history of migraine in both parents is associated with migraine frequency in adult males.[52]

A positive family history in cluster headache ranges from 2% to 22%, but is likely 6% to 10% overall based on studies with a confirmed diagnosis of relatives.[53,54] Patients with chronic cluster headache are twice as likely to have a positive family history compared with those with episodic cluster headache (23% versus 13%), as well as a higher attack frequency.[55] When one parent has cluster headache, about one-third of their relatives also have cluster headache.[56] An autosomal dominant pattern is common but not universal, and the penetrance rate is higher in males who typically inherit it from their fathers.[53] Among both men and women with cluster headache, almost 50% have a parent with migraine, typically a father. About one-half of patients with cluster headache also have migraine and a similar percentage report a family history of migraine.[56]

Learning of a family history is useful in several respects. It helps to explain to a patient that a genetic component contributes to the reason that they have a particular type of headache; it is estimated that up to 64% of cases can be primarily attributed to genetics.[57] If a relative exhibited a particular pattern of headache (eg, the mother of a female patient had migraine that remitted after menopause) the patient may follow a similar pattern. Treatments that were effective for one family member may also work well for their relatives. Genetic testing may be offered to patients with suspected familial hemiplegic migraine or CADASIL, or to unaffected relatives of known probands. Confirming a headache diagnosis in the patient, and sometimes in their relatives, provides families with additional information about their potential susceptibility to headaches.

MEDICAL HISTORY. The medical history yields clues for diagnosing migraine if the patient experienced infantile colic, torticollis, unexplained abdominal pain, vomiting or vertigo, or motion sickness in childhood. Suggest a parental consultation if the patient is unsure. Changes in headache patterns related to menses, pregnancy, perimenopause, and menopause frequently occur in people with migraine. A history of cancer or human immunodeficiency virus (HIV) raises the possibility of a secondary headache.

The general medical history helps guide treatment, as some medications are either contraindicated or ill-advised in patients with certain medical problems. Examples include triptans in patients with coronary artery disease, tricyclic antidepressants in patients who are prone to constipation, and topiramate in patients with a history of calcium phosphate kidney stones. Certain conditions are associated with primary or secondary headaches, including thyroid disease, systemic lupus erythematosus, polycystic ovarian syndrome, and joint hypermobility disorders.[58-61]

SOCIAL HISTORY. A standard social history reveals information about smoking, alcohol consumption, drug use, employment type and status, physical activity, and the home environment. It is particularly important to ask about current or previous physical, emotional, and sexual abuse. Migraine and tension-type headache are more prevalent in individuals with recalled childhood maltreatment, particularly in sexual and gender minority adults, often associated with coexisting anxiety, depression, and posttraumatic stress disorder.[62,63] This author includes a question on the new patient intake form regarding a history of physical, emotional, or sexual abuse and addresses it during the patient interview after confirming that the patient feels comfortable discussing it. If the patient does not seem amenable to direct questioning, an indirect approach, such as asking "What was the worst thing that ever happened to you (as a child)?" and following up with more specific questions about being hurt, battered, assaulted, or having something sexual done to them against their will, may yield more information.[64] Adverse childhood experiences are risk factors for migraine and other headaches in adults, as well as the progression from episodic to chronic migraine.[65]

Alcohol often triggers headaches, specifically migraine and cluster headache. Patients with cluster headache are more likely to smoke or have been exposed to secondhand smoke than the general population, although there is no evidence that smoking cessation improves the headaches.[66,67] Certain stressors at home or work may be identified that contribute to the headache burden.

CURRENT AND PREVIOUS MEDICATIONS. While the electronic health record is frequently used as a source of medication and allergy information, clinicians should avoid relying on it exclusively because inaccuracies related to entry errors and omissions can occur. This is particularly true for over-the-counter medications, specifically those used for pain relief. It is important to know exactly what medication the patient is taking and how often they take it. The timing of acute medication use during an attack is critical to assess effectiveness.[68]

In addition to current medications, obtain a list of drugs that the patient has tried in the past for headache treatment, including the strength, frequency, duration of action, effect, and side effects. The patient may need to check at home, with their pharmacy, or a pharmacy app and send the list at a later time.

The medication list can provide very useful information, such as a subtherapeutic dose of a preventive medication, overuse of acute pain medications that contribute to refractory headache, the potential for drug interactions with medications and potential headache treatments, or a medication that frequently produces headache (or another relevant symptom) as an adverse effect.

Knowing previous medications helps to formulate a treatment plan by either avoiding a past medication, trying it at a different dosage or trial duration, or combining it with another medication.

Assessing For Secondary Headache Disorders

The differential diagnosis of secondary headache disorders is vast. The mnemonic SNOOP (to snoop for red flags) provides a framework for thinking about secondary headache disorders, noting "red flags" in the history or examination that prompt further investigation. Initially described as SNOOP4 with four items beginning with a P, the list gradually expanded

KEY POINTS

- **The general medical history may reveal conditions that are associated with headaches as well as those posing contraindications to certain headache treatments.**
- **Familiarization with headache red flags reduces the likelihood of missing a potentially serious secondary headache disorder.**
- **When the phenotype suggests a primary headache disorder but treatments are ineffective, consider the possibility of a secondary headache disorder or acute medication overuse.**

over the years to SNNOOP10, which is detailed in TABLE 1-2.[69] Additionally, the possibility of a secondary headache disorder should be revisited when headaches with the phenotype of a primary headache disorder do not respond to treatment.

Keeping the possibility of a secondary headache in mind while taking the history, this section further expands on two secondary headache disorders.

PSEUDOTUMOR CEREBRI SYNDROME AND IDIOPATHIC INTRACRANIAL HYPERTENSION. Pseudotumor cerebri syndrome encompasses all cases of intracranial hypertension without ventriculomegaly or a mass lesion. Idiopathic intracranial hypertension (IIH) is diagnosed when no secondary cause is identified. The

TABLE 1-2 SNNOOP10 List of Headache Red Flags[a]

Sign or symptom	Related secondary headaches (most relevant ICHD-3 categories)
1 Systemic symptoms including fever[b]	Headache attributed to infection or nonvascular intracranial disorders, carcinoid or pheochromocytoma
2 Neoplasm in history	Neoplasms of the brain; metastasis
3 Neurologic deficit or dysfunction (including decreased consciousness)	Headaches attributed to vascular, nonvascular intracranial disorders; brain abscess and other infections
4 Onset of headache is sudden or abrupt	Subarachnoid hemorrhage and other headaches attributed to cranial or cervical vascular disorders
5 Older age (>50 years)	Giant cell arteritis and other headache attributed to cranial or cervical vascular disorders
6 Pattern change or recent onset of headache	Neoplasms, headaches attributed to vascular, nonvascular intracranial disorders
7 Positional headache	Intracranial hypertension or hypotension
8 Precipitated by sneezing, coughing, or exercise	Posterior fossa malformations; Chiari malformation
9 Papilledema	Neoplasms and other nonvascular intracranial disorders; intracranial hypertension
10 Progressive headache and atypical presentations	Neoplasms and other nonvascular intracranial disorders
11 Pregnancy or puerperium	Headaches attributed to cranial or cervical vascular disorders; postdural puncture headache; hypertension-related disorders (eg, preeclampsia); cerebral venous sinus thrombosis; hypothyroidism; anemia; diabetes
12 Painful eye with autonomic features	Pathology in posterior fossa, pituitary region, or cavernous sinus; Tolosa-Hunt syndrome; ophthalmic causes
13 Posttraumatic onset of headache	Acute and chronic posttraumatic headache; subdural hematoma and other headache attributed to vascular disorders
14 Pathology of the immune system such as HIV	Opportunistic infections
15 Painkiller overuse or new drug at onset of headache	Medication-overuse headache; drug incompatibility

HIV = human immunodeficiency virus; ICHD-3 = International Classification of Headache Disorders, Third Edition.
[a] Reprinted with permission from Do TP, et al, Neurology.[69] © 2019 American Academy of Neurology.
[b] Orange flag for isolated fever.

red flags for IIH and pseudotumor cerebri syndrome are a pattern change or recent onset of headache, progressive headache, atypical presentations, and papilledema.

The headache phenotype of increased intracranial pressure does not distinguish it from primary headaches; most individuals with IIH experience headaches that fit the description of either migraine without aura or tension-type headache. Headaches arising from IIH often respond to analgesics early in their course. The Idiopathic Intracranial Hypertension Treatment Trial found that more than 40% of participants, of whom 161 of 165 were women, had a prior history of migraine, more than twice the estimated prevalence in the general population of women.[70] However, patients with IIH can generally distinguish their IIH-related headaches from their previous migraine attacks.

Transient obscurations of vision and pulsatile tinnitus are common symptoms of IIH. Transient obscurations of vision generally last seconds to a minute with either complete or partial loss of vision in one or both eyes. They are often provoked by arising after bending over. The new onset of pulsatile or nonpulsatile tinnitus coinciding with the onset of headache also suggests intracranial hypertension.[71] Patients frequently do not volunteer the auditory symptoms, so direct questioning is imperative.

Although positional headache is mentioned in TABLE 1-2 as a red flag, patients with IIH rarely report rapid changes in headache severity with positional changes. The headache may be worse in the morning, as intracranial pressure increases after prolonged recumbence.[72]

IIH affects people of childbearing age with obesity, but pseudotumor cerebri syndrome does not share the same predilection due to the various causative etiologies. Thus, suspected patients should also be queried regarding the use of tetracycline and its derivatives (eg, doxycycline, minocycline), vitamin A and retinoids (eg, all-trans retinoid acid, isotretinoin), and lithium.[71]

INTRACRANIAL HYPOTENSION FROM A SPINAL CSF LEAK. The red flags for suspecting a spinal CSF leak include the following[69]:

- Sudden or abrupt onset of headache
- Pattern changes or recent onset of headache
- Orthostatic headache
- Headache precipitated by sneezing, coughing, or exercise
- Progressive headache and atypical presentations
- Posttraumatic onset of headache

Spontaneous intracranial hypotension includes spinal CSF leaks arising without an apparent precipitating factor or following relatively trivial trauma (CASE 1-3).[73] Dural puncture from procedures or surgery produces similar symptoms. The hallmark symptom, present in more than 90% of cases, is orthostatic headache.[74] The headache is often posteriorly located, involving the occipital region, neck, and shoulders ("coat hanger headache"), and is classically worse in the upright position and relieved in recumbency. The clinical presentation is quite variable among affected individuals, most of whom have other symptoms, such as neck pain and stiffness, vestibulocochlear symptoms (eg, tinnitus, hearing changes, imbalance, vertigo), cognitive changes (ranging

KEY POINT

- The symptoms of intracranial hypertension are myriad. Orthostatic headache is the most common initial symptom but the postural component may resolve over time. Careful questioning about other symptoms is needed, particularly if the headache onset pattern is a new daily persistent headache.

from "brain fog" to dementia), facial pain, movement disorders, nausea, and photophobia (CASE 1-3).[74]

There are no particular defining features of headaches due to a spinal CSF leak, although spontaneous intracranial hypotension is a cause of new daily persistent headache that begins abruptly. It may also masquerade as chronic migraine without aura. The headache typically worsens with Valsalva maneuvers (TABLE 1-1) and worsens as the day progresses. Subsequent limitations in upright time lead to marked disability, with some patients being incapable of performing basic activities of daily living.

In addition to asking about symptoms, one should inquire about potential precipitating causes and factors. Relatively minor trauma such as whiplash

CASE 1-3

A 39-year-old woman was referred for evaluation of severe photophobia which had previously been attributed to migraine. She had a history of migraine with visual aura since age 30 years that occurred with menses and one other time per month, and was easily relieved with rizatriptan. Her current headache began 3 years before her initial visit when she developed a "migraine" lasting 6 weeks. Rizatriptan was ineffective and a course of prednisone helped for 1 day. The fluorescent lights at her workplace bothered her. Several months later she could drive and tolerated sunlight and fluorescent lights. A year after symptom onset she only tolerated incandescent light. By the following year, she could only eat dinner by candlelight. At the time of her visit, she was no longer working, ate in darkness, and all light exposure triggered a migraine. Her head pain felt like a knife stabbing her in the head, a skewer in her head, or acid burning. The pain was occasionally bilateral with neck pain, associated with photophobia, phonophobia, osmophobia, and motion sickness. Once vomiting ensued, she had to go to the emergency department because her antiemetic medication did not work. She could not concentrate during a severe headache and she felt off balance, as though she would fall.

Her mental status and affect were normal. She wore dark sunglasses and covered her head with a towel during the visit when possible. She also covered the computer monitor with a towel when not in use. She brought a floor lamp to the examination with a 38-watt incandescent bulb. Her neuro-ophthalmic examination was normal. MRI of the brain with contrast, performed when her symptoms began, was reviewed and was normal. Further questioning revealed that she had lifted heavy equipment before the start of her first migraine episode. She had a history of joint hypermobility. Her symptoms were typically milder in the morning and worsened as the day progressed. Suspecting a spinal CSF leak, a nontargeted blood patch was performed.

COMMENT

This case demonstrates the importance of considering red flags for secondary headaches. The patient had a history of migraine but experienced a change in the pattern of her preexisting headache as well as profound photophobia, with features suggestive of intracranial hypotension.

injury, roller coaster rides, chiropractic manipulation, fly fishing, yoga, heavy lifting, protracted coughing, or vomiting may precede the headache onset.[71] Females are more commonly affected, many of whom have joint hypermobility, connective tissue disorders, or postural orthostatic tachycardia syndrome.[73-75]

PHYSICAL EXAMINATION IN THE HEADACHE EVALUATION

The physical examination in patients with headache should include:

- **Vital signs (blood pressure, temperature, height, weight, heart rate)**
- **General neurologic examination including a fundoscopic examination**
- **Palpation of cranial peripheral sensory nerves for tenderness or pain reproduction including the greater and lesser occipital nerves, auriculotemporal nerves, supraorbital and supratrochlear nerves, zygomaticotemporal nerves, and the trochleae. FIGURE 1-1[76] shows the distribution of peripheral nerves supplying the head.**
- **Nuchal range of motion and palpation for tenderness**
- **Neck circumference and Mallampati grade**

Additional examination maneuvers that are directed by specific clinical features include:

- **Assessment of jaw opening distance, crepitus, tenderness**
- **Palpation of the temporal arteries**
- **Otoscopic examination**
- **Trendelenburg test (This is useful for evaluating patients with a suspected spinal CSF leak. Place the patient in 5 to 10 degrees of Trendelenburg for 5 to 10 minutes. Improvement of headache or other symptoms in the Trendelenburg position is highly suggestive of this diagnosis.[77])**

QUESTIONNAIRES

Taking a headache history should be a comprehensive process with many different facets. Headache specialists routinely incorporate various questionnaires, filled

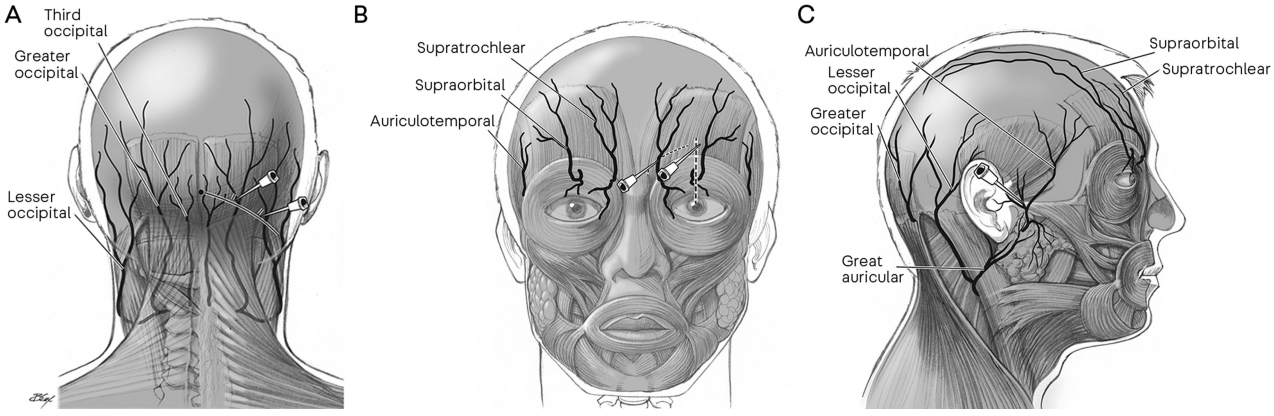

FIGURE 1-1

Cranial and upper cervical nerve branch injection sites for peripheral nerve blocks for headache disorders. Common peripheral nerve block injection site locations include the greater and lesser occipital nerves (*A*), the supraorbital and supratrochlear nerves (*B*, *C*), and the auriculotemporal nerves (*B*, *C*).

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New Patient Questionnaire

Follow-up Questionnaire

out before the appointment, to glean as much information as possible during the office visit. Paper questionnaires may be used, although programming the questionnaires into the electronic medical record and distributing them before the visit eliminates the cost of staff time and postage for mailing paper forms.

TABLE 1-3 lists commonly employed validated questionnaires. Recommended questionnaires cover headache disability (the Migraine Disability Assessment is often used in practice for all headache types but was developed specifically for migraine), anxiety, depression, sleep apnea, and posttraumatic stress disorder.

A questionnaire specifically targeting important aspects of the history is extremely useful. It serves as a guide to the interview, directs the flow of the interview, and gives the patient an idea of what types of questions will be asked before they enter the examination room. This author's new-patient and follow-up questionnaires are available as Supplemental Digital Content for this article (*links.lww.com/CONT/A403*, *links.lww.com/CONT/A404*), and both can be accessed through the QR codes in the margin.

Online questionnaires incorporating machine learning use data entered by the patient to develop a diagnosis (or differential diagnosis) and treatment suggestions that patients can take to their clinician or provider.[6,78,79]

Although questionnaires and online tools are helpful for data gathering and classification, a face-to-face encounter is often more accurate and still has considerable value for observing facial expressions, body language, tone of communication, and other cues.[80,81]

TABLE 1-3 Commonly Used Validated Questionnaires in Headache Medicine

Questionnaire	Abbreviation	Purpose	Number of questions	License needed?
Allodynia Symptom Checklist	ASC-12	Cutaneous allodynia	12	No
Berlin Questionnaire		Sleep apnea in adults	6	No
General Anxiety Disorder-7	GAD-7	Anxiety	7	No
Headache Impact Test-6	HIT-6	Headache impact on functioning	6	Yes
Migraine Disability Assessment	MIDAS	Migraine disability	5 + 2	No
Migraine Functional Impact Questionnaire	MFIQ	Impact of migraine on physical, emotional, and social functioning (adults)	26	Yes, for research
Migraine Treatment Optimization	MTOQ	Response to acute migraine treatment	5	No
Neck circumference, Obesity, Snoring, Age, Sex	NoSAS	Sleep apnea	5	
Patient Global Impression of Change	PGIC	Change in condition in response to treatment	7	No
Patient Health Questionnaire	PHQ-9	Depression	9	No
PTSD Checklist for DSM-5	PCL-C	Posttraumatic stress disorder (civilian)	17	
STOP-BANG Questionnaire	STOP-BANG	Sleep apnea	8	

WRAPPING IT UP

First and foremost, straightforwardly convey the diagnosis. The American Migraine Prevalence and Prevention study, performed in the early 2000s, reported survey results of 162,576 individuals from almost 80,000 households regarding migraine diagnosis and treatment.[82] Participants' responses to migraine features based on the International Classification of Headache Disorders, Second Edition identified them as having migraine or other severe headaches. Surprisingly, only 56.2% of those with an International Classification of Headache Disorders, Second Edition diagnosis of migraine had ever received a medical diagnosis of migraine. Self-reported headache types from the undiagnosed group included sinus headache (39%), tension-type headache (31%), and stress headache (29%). Diagnoses are now coded in electronic medical records and patients can easily access them, although this is not an ideal communication strategy. If the diagnosis is uncertain, explain why and outline the next steps to confirming one.

The "ask-tell-ask" strategy incorporates building on, and correcting when needed, the patient's existing knowledge[83]:

- ASK the patient to describe their understanding of the issue.
- TELL the patient the facts at an understandable level, correct misconceptions, and validate their correct responses. This should not be overwhelming in length or detail.
- ASK the patient if they understood what you said, and to explain or rephrase it.

Convey realistic expectations. Patients often want their headaches "cured," which is an unrealistic goal for most primary headache disorders. Most patients will achieve marked improvement with headache management but it may take some time to find an optimal individualized treatment strategy. A reasonable goal is to have fewer and less severe headaches with effective acute treatment when needed. This is a good time to repeat back what the patient conveyed in the interview (eg, "Our goal is to improve your headaches so you can go to work or school, be present at your children's activities, make plans, or go on vacation.").

Some patients are too intimidated to ask questions. A nonthreatening way to frame the request for questions is, "Is there anything else I can help you with today?"

Discuss prescriptions, common side effects, and dosing schedules (nursing staff can help with this, if available). Schedule a follow-up appointment and instructions for between-office communication.

TAKE-HOME INFORMATION, LATEST DEVELOPMENTS, AND RESOURCES

Patients have various degrees of health literacy and abilities to retain what is conveyed in an outpatient encounter. Numerous studies show that patients recall and understand as little as 50% of information conveyed during an office visit.[84] Differences also exist among both patients and physicians when using the patient portal for secure electronic messaging.[85] These factors affect adherence to treatment plans.

The electronic medical record allows us to easily put our instructions in writing and provide information about a patient's condition using "smart

KEY POINTS

- The history often yields the headache diagnosis but certain aspects of the physical examination should be included, especially fundoscopy.
- Both intake questionnaires and validated questionnaires for common headache comorbidities provide useful insight and help make history taking more efficient. The most successful results arise from having the patient complete questionnaires before the appointment.
- The "ask-tell-ask" strategy reinforces the patient's understanding of their headache diagnosis and plan. Make sure to communicate realistic goals and expectations and invite the patient to ask questions.

phrases" in the after-visit summary. Links to various reputable websites vetted by the practitioner can also be included. Several studies performed in the primary care setting show that the after-visit summary reduces the number of telephone calls for medications and test results between visits, and patients perceive them as useful.[86-88]

After-visit summaries have the potential to be a powerful educational tool but they are often poorly organized, too long, contain unnecessary information with pages of general health information, and are confusing for patients to navigate. Redesigning them to be patient centered, with enhanced readability and understandability, is frustratingly difficult and sometimes impossible depending on the platform.[89] Despite our good intentions to convey clear information to

TABLE 1-4 **Resources for the Office Visit and Beyond**

Name	Website	Description
Clinician resources		
International Classification of Headache Disorders, Third Edition	ichd-3.org	Official classification system and diagnostic criteria for primary and secondary headache disorders
American Headache Society	americanheadachesociety.org	Professional organization, meeting information, find a headache specialist, education on demand for clinicians and residents
Beighton Score	ehlers-danlos.com/assessing-joint-hypermobility	Scoring for joint hypermobility
New Patient Intake Questionnaire	Available as Supplemental Digital Content for this article	Dr Friedman's questionnaire that can be printed or programmed for online use; add validated questionnaires (eg, MIDAS, GAD-7, PHQ-9, STOP-BANG, ASQ-12, PTSD) as desired from TABLE 1-3
Follow-up Visit Questionnaire	Available as Supplemental Digital Content for this article	Dr Friedman's questionnaire that can be printed or programmed for online use; suggest also including a headache disability/impact questionnaire
Resources for clinicians and patients		
BonTriage	bontriage.com	Patients answer questions online about their headaches; software generates a diagnosis and suggested treatments to discuss with their clinician with electronic medical record–compatible reports
Resources for patients and families		
American Migraine Foundation	americanmigrainefoundation.org	Educational resources and advocacy tools for people with migraine
National Headache Foundation (NHF)	headaches.org	Educational resource for patients, find a provider, training for primary care professionals, resources for military personnel, tracking app

CONTINUED ON PAGE 319

patients, including manually highlighting important educational information, the paper after-visit summary often ends up in the trash.[87] Studies also show that prepopulated information in the after-visit summary, such as medication and allergy lists, is often inaccurate and that the highest recall is for medications and physician instructions.[87,90]

As written information is not always effective, one might consider video recordings of the visit. Many medical centers prohibit the unauthorized use of video and many physicians are reluctant to be recorded. However, a study surveying 2800 patients seeing eight different neurosurgeons generated responses from about one-third of survey recipients.[91] More than one-half watched their video more than once, and more than two-thirds shared it with a

CONTINUED FROM PAGE 318

Name	Website	Description
Office of Women's Health	womenshealth.gov	Answers to commonly asked questions about migraine
WebMD	webmd.com	Migraine information for patients
Miles for Migraine	milesformigraine.org	Walk/run/relax fundraisers, educational events for patients and family programs, support groups, social events
Migraine Canada	migrainecanada.org	Patient education, advocacy, library, headache clinics, Canadian health care coverage issues
Clusterbusters	clusterbusters.org	Supports research for cluster headache, advocacy, patient resources
Cluster Headache Warriors	clusterheadachewarriors.org	Patient support, education, education, advocacy, research support for cluster headache and other trigeminal autonomic cephalalgias
Diary apps		
Migraine Buddy	migrainebuddy.com	Migraine tracking app
Manage My Pain Pro	managemypainapp.com	Tracks headaches and other chronic pain
Migraine Mentor	bontriage-headache-tracker-ios.soft112.com	Uses artificial intelligence to provide patient feedback
iHeadache	iheadache.com	Detailed headache tracking
Migraine Insight	migraineinsight.com	Migraine tracking app
Paper diaries		
Paper Headache Diary	Available as Supplemental Digital Content for this article	Dr Friedman's downloadable paper diary
NHF Headache Diary	headaches.org/wp-content/uploads/2021/05/HEADACHE-DIARY.pdf	Downloadable paper diary

Headache Diary

family member, friend, or other physician. Three-quarters of those surveyed reported that they could remember more from their visit, and one-half indicated that the video made them feel more at ease with their medical problem. Almost 90% felt that the video was helpful and 98.5% recommended that future visits be recorded. No one felt that it was intrusive and no one used the video in a medical-legal action.

Headache diaries are invaluable for assessing a patient's progress. Options include a paper calendar, a calendar on the patient's smartphone or computer, and apps specifically designed for headache or migraine tracking. **TABLE 1-4** provides resources for use in the office visit, patient education, and diary apps. This author's paper headache diary is available as Supplemental Digital Content for this article (*links.lww.com/CONT/A407*), accessible through the QR code in the margin.

CONCLUSION

Each patient with headaches is different, and each initial visit is different. The process of getting to know your patient and arriving at the correct diagnosis and optimal treatment is largely comprised of conversations; new information emerges with every visit as you and the patient think more deeply over time. Familiarity with common headache disorders helps to focus the line of questioning. Similar to doing a neurologic examination, an organized approach is helpful. Previsit questionnaires help the patient know what types of information are needed and prevent the clinician from leaving out essential aspects of the history. The detective work of history taking, patient relationships, advances in science and therapeutics, and the ability to help individuals with headaches substantially improve their quality of life are what make headache medicine fun and rewarding.

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DISCLOSURE

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Scottsdale Headache Symposium with the American Headache Society, and as a treasurer and a member of the board of directors with the Southern Headache Society that are relevant to American Academy of Neurology (AAN) interests or activities.